

great, and the antithesis of those abounding reproductions of the outer shells of things by lesser men.

However, it is not probable that any one ever painted character by setting himself to do so. The painter must consciously paint the exterior in a painter-like manner, calling up all his training in composition, drawing, lighting, and choice and handling of pigments; and meanwhile, unconsciously, if he has the gift, he will be putting into his work the product of his second sight and revealing the very life of his sitter.

Tact is a prime necessity. A well-known painter, who does children occasionally, scolds them into quiet behavior, eliminating the while all trace of natural expression; but the clouds of cherubs in M. Bouguereau's paintings witness to his capacity to get the best from his little sitters. "How beautiful you are while you sit like that! You cannot guess how beautiful. Don't move or you will spoil it all!" he tells them; and they endure the fatigue of one position with Spartan firmness.

Reynolds's courtier-like quality is seen in his signature of his portrait of Mrs. Siddons in such a way as to permit him "to go down to posterity on the hem of her garment." Other painters had signed their work in a similar manner. Raphael's name is seen on the hem of the Madonna's robe; but Reynolds's noteworthy adaptation of the idea was worthy to have made him painter to the royal family, rather than his impulsive rival Gainsborough.

A certain self-confidence, as in a good physician, is a fine endowment for a portrait painter, also a capacity for setting the tongue to going upon interesting anecdotes of travel and reminiscence, and then going off and leaving it to entertain the sitter while the mind is intensely concentrated upon the difficult problem in hand. It is said that Mr. Sargent paints his best while everything interesting is going on in his studio. The result probably of the habit of art work from childhood—which renders his power to give visible form to his thought almost automatic.

Photography is one of those insidious aids to the portrait artist which leads, like the confirmed habit of crutches, to a kind of motor paralysis. The gradual cheapening of its methods, until now a life-size solar print of a head can be obtained for twenty cents, is a great satisfaction to the part of the community who indulge in crayon portraits for the price of the frame; but the connection between art creation and photography is becoming clearer daily as that of master and serf, magician and gnome. In an inartistic community it is not strange that the portraits of the dead should constitute the greater part of the orders of a painter who is trying to live, and while they may be destructive to his budding talent they are indisputable aids to his edification in patience.

Here is a tale told for its truth, and not at all because it is extraordinary. The material consists of photographs with verbal description only as a guide to color. The first photograph, a camp carte de visite, represents a spare young man with full beard, a full-length view showing a sergeant's uniform. The second photograph shows the head and shoulders of the same man with mustache only, grown portly with sixty winters. From the conditions of this problem it is required to evolve a full-length oil portrait of the man at the age of sixty-five, with full beard and in Colonel's uniform. It is in a case like this that the painter may be asked to use a new preparation of ground glass to give a more lifelike expression to the eye.

The painter is more fortunate than his brother who was given a *carte blanche* order for ancestors without being embarrassed by any representations of the same, by a *nouveau riche*, wherein draperies, costumes, armor and high and aristocratic lineaments might play what rôle he pleased, provided the line of ascent led back to *La Belle France* and the embarkation of William the Conqueror. Is it remarkable that a witty novelist, as in "The Pratt Portraits," may find in such situations theme for an amusing tale?

NEW YORK CITY.

376 Sanitary.

Miseries we Have Escaped by not Being Born too Soon.

I.

DR. EDWARD G. JANEWAY, the eminent practitioner, and Dr. Y. Mitchell Prudden, the accomplished bacteriologist, have each given, within the last year, most interesting public addresses on that recent progress in medicine that has at last made of it a true science instead of a series of happy or unhappy guesses founded on very incomplete and imperfect knowledge. Each congratulates those at present living as having been born into a happier time, and each prophesies the great results to come to the general public through universally diffused accurate knowledge, and the application of that knowledge to what is certainly to be the medicine of the future—the prevention of disease through hygiene and sanitation. Dr. Prudden says:

"Many of our institutions for higher education now rec-

ognize the value of a knowledge of the body, and of the physical conditions under which man can best secure the highest usefulness and enjoyment; but I do not think that as yet this subject has received attention at all commensurate with its vital bearing upon the well-being, spiritual as well as physical, of those whom the universities equip. So long as a knowledge of the human frame was looked at from the standpoint of the dispenser of mysterious drugs to a mysterious organism for the purpose of expelling mysterious foes; so long as the body was regarded chiefly as a more or less disreputable tabernacle for the temporary uses of the soul; so long as its harmonious and significant relationship to other forms of being lay largely beyond our ken—so long, I say, as all these conditions prevailed, accurate knowledge of the body and the factors necessary to its well-being did not command attention in the higher educational outlooks."

(The address was printed in *Popular Science* for January, 1896.) Both addresses chiefly dwelt upon the progress within this century, and on the evils we have thereby escaped; and it has seemed as if an examination of the conditions previously obtaining might be valuable, if not practically, at least to make us thankful that we were not born too soon; and to be in touch with the present outburst of Americanism, a good point at which to begin seemed to be the actual conditions, medically speaking, that surrounded the forefathers.

Previous to their departure from England, medicine consisted mostly in a knowledge and use of simples—i. e., of herbs—and the housemother was the purveyor and dispenser. Gervase Markham, who wrote "The English Housewife" some years before our ancestors left that country, says, "A knowledge of physic is a principal virtue of a housewife." He gives directions to the housewife how to cure most diseases, but confesses that "some fevers may pass the housewife's capacity." He speaks as if each of his remedies were infallible; they were called "sovereign." While none were injurious, many of them were inert, others ridiculous; and here and there it is seen that the essential virtues of some of the most valuable of modern remedies had at least been partially disclosed. For instance, when he directs powdered saffron to be mixed with poppy seed and lettuce seed, and then mixed with woman's milk, to be bound on the temples for sleeplessness, we see that the king of soothing medicines, opium, was even then beginning to be known. For apoplexy or palsy "the strong smell of a fox is exceeding sovereign." For quinsy the patient was to drink a decoction of mouse-ear in ale, and there was to be "a stone rubbed where a hog had rubbed, and then the swelling was to be rubbed with it." Pains in the bones were to be treated with oil of swallows, the directions for making which are "to beat about twenty kinds of vegetables"—which he enumerates—in a mortar with "twenty quick swallows," and butter and wax are to be added. An ancient aphorism, "Every part strengthens a part," led to the use of the most repulsive and unlovely secretions, even to excrements of animals; and there were some which evidently held a mystic element, such as a bone from the heart of a stag, the left foot of a tortoise, blood from under the wing of a white pigeon, and many more equally absurd, but used through the authority of the most learned physicians of the time. When we read that for a new cold or cough sugar and aqua vitæ—euphemism for brandy—was to be taken on going to bed, we are reminded of rock and rye of to-day; and when we find that for that parasitical disease very rife in the old times—itch—quicksilver beaten with other substances as an ointment was used, we see that they were on the track of the great destroyer of microbes now universally used as bichlorid of mercury. Nearly every family had its own combination of wax, rosin, turpentine and lard as a plaster for burns, cuts and other wounds; and many of these salves bore the name of some famous physician. In England many medicinal plants were cultivated in gardens, and treatises upon them were written and printed; and the New Englanders planted from seeds brought from the old country sage, hyssop, rue, tansy, wormwood, celandine, comfrey, saffron, mallows, chamomile, Mayweed, yarrow, shepherd's purse, dandelion, patience, bloody dock, elecampane, motherwort, burdock, plantain (which the Indians named white man's footstep), catnip, mint, fennel and dill. A housewife was supposed to know at just what period the virtues of each particular plant were most potent, and when was the propitious moment for its garnering in one of those aromatic attics that formed the pharmacopœial armamentarium of the wise mother. Some physicians followed this vegetable schedule of treatment called galenical in contradistinction to the chemical—which meant the use of minerals—found to be most efficient in many diseases but from that time to this encountering a prejudice wholly undeserved. A Dr. Balivant, of Boston, is commended forasmuch as "he does not direct his patients to the East Indies for drugs when they may have far better out of their gardens"; and this simple practice largely prevailed here, while into England, in 1660, there were imported 250 kinds of drugs, animal, vegetable and mineral, on which duty was paid; and so great was the number of substances used that a

writer of the time indulges his satirical propensities thus:

"Doctors are not slow to pour drugs of which they know little into bodies of which they know less."

Science.

The Latest Concerning Niagara Falls.

BY PROF. G. FREDERICK WRIGHT.

THE data bearing on the formation and age of Niagara Falls was the most prominent object of discussion in the geological section of the A. A. A. S. at its recent meeting in Buffalo. Most valuable additions to our knowledge of the subject were made especially by Dr. G. K. Gilbert, of the United States Geological Survey, and by Mr. F. B. Taylor, of Fort Wayne, Ind. Both these gentlemen had made estimates which were approximately in harmony as to the depth of the water throughout the gorge below the Falls to Lewiston. As the current is, in most places, too swift to permit of direct measurement, the depth has to be calculated from the known quantity of water passing out of Lake Erie, combined with the known width of the channel at various points and the estimated velocity.

From the present Falls down to the railroad bridges the current is so gentle that the depth can be determined by sounding, and is found to be a little less than two hundred feet. Through the rapids above the whirlpool, however, the depth is less than fifty feet, while the current is here about twenty-three miles per hour. At the whirlpool, again, there is a great increase of depth, reaching even lower than above the rapids. But just below the stream shallows up again to fifty or sixty feet, with a gradual increase in depth to the mouth of the gorge.

These determinations of the varying depths of the channel are thought to have an important bearing on the history of the formation of the gorge, and on the time required for its erosion; for it is maintained that the depth of the gorge below the water line, as well as its width, has been determined by the relative amount of water pouring over the cataract from time to time. The greater the amount of water the greater would be the depth of erosion by the plunging torrent. This is illustrated by a comparison of the present Horseshoe Fall and the American Fall. The Horseshoe Fall has such a torrent of water that it grinds to powder and removes all the rock fragments which break off from its edge; while the American Fall is unable to accomplish this all-important part of its work, and these are left to break the force of the falling water and prevent the deep erosion of the channel.

The next part of the problem is to determine the cause of these varying volumes of water passing over the cataract, and to estimate their continuance. The conclusions of Dr. Gilbert and Mr. Taylor agree closely with those which were published by the writer in THE INDEPENDENT for November 10th, 1892. This theory is that Niagara was for awhile relieved of the larger part of its volume of water by another outlet to the waters of the four upper lakes. Clear indications of such an old temporary outlet were found over the pass from Lake Nipissing into the basin of the Ottawa River through the Mattawa at North Bay. This pass is now not over one hundred feet above the level of the rock bottom of the Niagara where it emerges from Lake Erie.

From general considerations, this amount of depression at North Bay is probable enough; for there is no question that when the ice retreated from the St. Lawrence Valley, the subsidence of the land at Montreal was five hundred feet, diminishing, however, both toward the south and west. There can, therefore, be little doubt that when the ice had melted back far enough to uncover the Ottawa Valley, the North Bay pass was low enough to rob Niagara of most of its water, thus greatly retarding its rate of erosion. How long this condition of things continued is largely a matter of conjecture. But there are many things which indicate that the re-elevation of the region was, geologically speaking, rapid, not occupying more than a few thousand years. Dr. Gilbert and Mr. Taylor, however, make it longer than some others would do, by attempting to correlate it with the erosion by a greatly diminished volume of water indicated in the narrow and shallow gorge at the rapids above the whirlpool.

The theoretical character of all these estimates is further shown by the complications which come in, in connection with the whirlpool. This remarkable phenomenon is caused by the fact that the present gorge here intersects a preglacial gorge worn by a small stream which had its escape through the limestone escarpment westward at St. Davids, but which is now filled by boulder clay of the glacial period. But it is still a question how far up toward the present cataract this preglacial stream had eroded its channel, and so diminished the postglacial work remaining to be done by the main stream.

The total result of these recent inquiries does not

seem necessarily to disturb the estimate of about ten thousand years which has been accepted for some time as the period represented by the work of erosion from Lewiston back to the Falls. This estimate, however, may be lengthened or diminished according as weight is given not only to the hypothesis of the Nipissing outlet, but also to two or three other hypotheses concerning changes of level since glacial times, which may have shifted the outlet of the Great Lakes. For so delicately are these poised that less than fifty feet of elevation at Buffalo or depression at Chicago would now divert the flow of water from the Niagara to the Illinois River; while another temporary outlet probably existed north of Lake Simcoe through the Trent Valley. Spice is added to the discussion by Mr. Spencer, who is of the opinion that the northeasterly elevation, which determined the closing of the Nipissing and Trent outlets, is still in progress; so that in two or three thousand years Nature herself will provide for the sanitation of Chicago, and turn the whole drainage of the Lakes again into the Mississippi without a canal.

OBERLIN, O.

Education.

IN striking contrast with the progressive spirit and high standards of Italian universities is the dark shadow of illiteracy that envelops the common people. By recent estimates forty per cent. of the population cannot read, a condition which in some measure is due to the prevalence of oral instruction, as in all Catholic countries. The present Minister of Public Instruction, Sig. Ferdinando Martini, has been unsparing in his efforts to overcome this evil, and gradually the cloud is lifting. The enforcement of the compulsory law is having marked effect, while the establishment of regimental schools and the obligation laid upon every soldier to master the rudiments is diminishing the number of adult illiterates. Evening schools are adding to the elementary branches those ideas of civic responsibility and of personal worth that are essential to the citizens of a developing country. Much of the success of these measures is due to reforms in methods of teaching, and more especially in the books employed. The Minister has been the inspiring spirit in these changes. He is himself engaged in preparing a reading book suitable for children, and has induced several well-known literary men to undertake similar tasks. In Russia, with seventy per cent. of her population classed as illiterate, there are signs of a spontaneous movement toward popular education. A large number of *Zemstvos* (local councils) have appealed to the Government for the abolition of corporal punishment and in favor of a universal system of public schools. These efforts have, so far, simply excited alarm and led to repressive measures. Meanwhile, attempts have been made to infuse some life into the parochial schools, which exist in little more than name.

....During the disturbances in Constantinople the American College for Girls has held on its way without changing its course or appearing to be injured by the political condition. There is the usual large number of students of different nationalities, so that English is the adopted language of the curriculum, although each student must pass a creditable examination in her own vernacular. Special courses are given in Latin, Armenian, ancient and modern Greek, Slavic, Bulgarian, French and German; and the Bible is included in every year of each elective course. On account of the absolute lack of preparatory schools, the institution provides all grades from the kindergarten to the full college courses. It has an excellent musical department and elaborate lecture courses, conducted by gentlemen outside of the college, including several of the professors of Robert College. Among the interesting features is the Self-Government Association, composed exclusively of students, which has the entire care of the government of the college. There is also much philanthropic and Christian work done by various societies, and these have been especially developed during the sufferings of the past year. The commencement exercises last summer were made especially interesting by the presence of Miss Clara Barton, of the Red Cross Society. There were also representatives of the highest officials in the Turkish Government and the Armenian and Greek Churches. Professor Hilprecht, of the University of Pennsylvania, and Professor Gildersleeve, of Johns Hopkins University, were also present. The latter gave the commencement address, which was one of great power, and will be remembered long by the students.

....There is encouragement for the school reformers in this city at the Mayor's appointment of Henry W. Taft to succeed Mr. Hunt, whose term as Commissioner has just expired. Now that the Reform School Bill has passed the Legislature, this appointment shows how the Mayor stands in his attitude toward the Board of Education; and we can now trust that when the offices of seven more of the obstructionist commissioners become vacant, they will be filled by men of Mr. Taft's type. Mr. Taft is a graduate of Yale and a successful

an entirely new industry, and in a country without traditions he will begin one followed by thousands of pupils filled with the same respect for him that we have for our own masters."

NEW YORK CITY.

Sanitary.

Miseries we Have Escaped by not Being Born too Soon.

II.

EDUCATED physicians were so few, that almost perforce the clergymen were found shining forth in what Mather, in the "*Magnalia*," called the "Angelical Conjunction"—combining minister and physician in one. It is also pleasant to note that the *woman* highly skilled in medicine had also come upon the scene, as early as 1631; for the wife of the Rev. John Eliot was one of those possessing skill in both medicine and surgery—but attending the sick and maimed without reward; and, later on, at the close of King Philip's War, Mrs. Allyn was allowed twenty pounds for attending sick and wounded soldiers by the Connecticut Council. Also the wife of William Miller, of Northampton, sometimes acted as a surgeon; and in 1688, in an authentic history of Virginia, "a gentlewoman, a noted female doctress" is mentioned, who cured those bitten by mad dogs!

Many of the towns along the Connecticut River were without any resident physician for long periods—thirty and forty years; but it was almost inevitable that in their pioneer life there should be calls for the knowledge and services of a bonesetter—and there are men just as surely inspired to do this work as are the dictionary makers and the collectors of queer and useless articles. Their vivisection must have been confined to the killing and cutting up of domestic and wild animals for food; for Eliot, writing in 1647, says:

"We never had but one anatomy [skeleton] in the country which Mr. Giles Firmin did make and rede upon well";

but Mr. Firmin was in advance of his times in medicine, and found it a scarcely paying business, for he writes to Governor Winthrop:

"I am strongly sett upon to study divinitie. My studyes else must be lost, for physik is but a meene helpe."

And he went back to England.

For half a century after the settlement of the four towns, Northampton, Hadley, Hatfield and Deerfield, the average annual expense of doctor's bills was not more than \$200, excluding those who were wounded by Indians. In 1727 the town of Hadley voted to give fifty pounds toward inducing "a good bonesetter" to locate among them if other towns would join them. We occasionally read of some of those tough old pioneers living to great age; but let no one imagine that those "former days" were better than ours. The average of human life was far shorter than now; and plain food and early hours were the rule—and the mischief of intoxicating drinks was almost unknown. Only those who can realize how anesthetics alone save life—for simple pain kills, if severe enough—can appreciate how suffering men and women laid down their lives untimely, because they had been born too soon; for, with all the flippant sneers at doctors and their inevitable limitations, there is no question that a well-educated physician, also endowed with common sense, is a valuable man in any community.

The above sketch includes palpable diseases capable of being cured by tangible remedies, and does not touch on the large province of the diseases of "Faith" and Fascination, surrounded and enhanced by a profound belief in the abilities of what were called the "powers of darkness," among which was witchcraft, and the forces which were to be brought against it.

Education.

Educational Status of the Country.

THE latest report of the Commissioner of Education gives a very interesting view of the educational status of our country. For the school year 1894-'95 not less than 16,000,000 pupils attended the schools and colleges during some portion of the year, and of these about fourteen and a quarter millions (exactly 14,280,070) were in establishments supported by public funds. The common schools of the United States claim the vast proportion of this enrollment, namely 14,201,752, an increase of very nearly 2 per cent. over the enrollment for the previous year. The significance of this ratio is emphasized by comparison with the increase in population estimated at 1.26 per cent. The commissioner notes also that "for every 10,000 persons there are 98 more enrolled in school than there were in 1880."

"While in respect to the number of pupils enrolled in school the United States occupies an enviable position, the average attendance maintained, 66.11 per cent. of the enrollment, is below that of many countries. It must be remembered, however, that this general statement covers

lighted from the dome, is a lateral gallery lit by a gable of glass sharply enough pitched to shed the Northern snows. Mr. McKim is a colorist in architectural material, and the green of the bronze dome is suggested in the glass of these lights before it is echoed in bronze reproductions of early Greek statues of Demosthenes and Sophocles, which stand in niches, breaking the blank brick walls of the fronts of the lateral galleries. "Buff," as it is called, but really tinged light gray limestone, is used for these niches, with their entablatures, for the pedestal and buttresses at the entrance, the quoins, architraves, etc., of the wings, and for the entire middle portion of the façade.

As one enters the Loggia of the central portion he passes between copies of the famous Florentine lion of the Loggia di Lanzi on pedestals on either side of the central steps. In front of the Loggia, supporting the wall above, which arches over the entrance, are a pair of Ionic columns and a single one on either side, making six in all. Circular niches over the main entrance are filled with copies of the heads of Hermes by Praxiteles, and of the Bearded Dionysus, while over the door, within the Loggia, is a copy of the Homer of Naples. The building rises from a flat platform, with a parapet of Freeport granite, which is said to be one of the happy afterthoughts for which this firm is famous.

One passes through the Loggia, decorated by Mr. Garnsey in Pompeian red, with classic pattern, into the central hall, where, under the coffered dome, are the mural paintings, of which we have heard so much, by Messrs. Vedder, Thayer and Cox, symbolizing the Art of Rome, Florence and Venice. "Athens," by Mr. La Farge, is not finished; but as it is to be placed over the entrance, the lack does not disturb the impression of completeness and beauty in the first glance.

It was a happy thought in the division of subjects that "Rome" falls to Mr. Vedder. The crowning conceptions of the great Florentine draftsman are in "Rome," and Mr. Vedder is both thinker and draftsman.

His art is saturated from the Sistine fount, his space is divided and filled with well-disposed lines, and he has recognized both the flatness of the wall which he is ornamenting and its connection with the architectural moldings below in a way which shows, by contrast with the lunettes on either hand, how crude and inexperienced as yet are our best American decorators, among whom he hardly counts, having lived so long abroad. Mr. Cox was so far advanced as to know that his composition should be thrown back by a step which runs across the lower portion of his tympanum; but it is bare, like too much of his canvas. Mr. Thayer added a step to his composition after its arrival and before it was put in place, and spotted it with five red, egg-shaped shields bearing the arms of Florence and her families, in order to bring the color scheme of his canvas into that of the wall. It is Mr. Vedder's triumph that his work survives the broad gold molding which arches all the tympana and, above his work, screams in the full light of the dome, and the Venetian red of the wall coloring, so incongruous with his habitual cold color scheme; both molding and wall color having been arranged with reference to Mr. Cox's painting, the first in the field. Mr. Vedder represents Nature standing against a circle of blue cloud forms, her right hand resting on the tree of life "Alpha," its roots in a skull. "Omega" is a tree with fruit and a lyre on the left. Other figures symbolize Thought, the Soul, Color and Love. A band of festoons and masks runs across the lower part of the painting.

Mr. Cox represents "Venice Enthroned" with diadem, scepter and olive branch. Reclining figures at the left and right represent Mercury, or Commerce, and Painting, against the sails, lagoons and the lion of St. Marks. The coloring is agreeably reminiscent of the Venetian school, but all the knowledge and ability displayed leave it disagreeably earthly and fleshly.

Mr. Thayer has given us one of his tender, soulful paintings, full of color suggestive of ancient glass—"The Heavenly Guardian of the Arts," a white-winged figure shelters at her feet children, symbolizing painting and sculpture, who are received by a man and woman, typical Florentines, in attitudes of adoration. With all its spirituality and color, it could be ill spared from the space which it hardly fills as a mural painting should.

Under the big bronze lantern, copied from one at the Chateau de Blois, suspended from the dome, and under the Vedder lunet, we pass into the rear gallery with curved ends, where all the objects contained are the gifts of the Misses Walker. The wall inscription reads:

"This room is dedicated to the memory of Sophia Wheeler Walker, for whom the first picture gallery at Bowdoin College was named, in 1850, by her son, Theophilus Wheeler Walker, The Sophia Walker Gallery."

A beautiful bronze relief of Mr. Walker, by D. C. French, is the greatest ornament of the room. The ladies who give the present building are his nieces and heirs. The paintings by Millet, Troyon, etc., and by Winslow Homer, etc., are not choice examples, tho they represent excellent names. There are initial steps in collections of ancient glass Greek vases, iron work,

armor, tapestries, needlework, Roman sculpture, mediæval pottery, fans and miniatures; among the latter is one of Lady Byron's mother, by Benjamin West, 1799.

In the lateral galleries are the remarkable Bowdoin collections of drawings by the old masters and of paintings of which the choicest are early American, both described some years ago in this column, by Miss Susan Hayes Ward; the Boyd collection, with gems by Reynolds, Smibert(?) and Copley; Japanese paintings, bronzes etc., and some fine casts.

In the basement are some Assyrian slabs, near the rooms for the college art classes, which will be this year under the instruction of Mr. A. V. Currier. A building like the Walker Art Building is an assurance of the character of the art objects which will accrue to it, but the treasures which it already contains, are worthy of careful consideration.

NEW YORK CITY.

Sanitary.

The Miseries We Have Escaped by not Being Born too Soon.

III.

AN account of the state of medicine as a science in the century of the arrival of the Pilgrims in America, would be incomplete without a reference to the delusion of witchcraft, which reached a fearful height just at its close. In a curious old volume published in 1695—just two centuries ago—called a "Compendium of the Theory and Practice of Physic," by William Salmon, witchcraft is enumerated as a "Disease of Fascination." He says it may be known by

"pinings and wastings of the whole body, which many times so alters it as if it was not the same Creature, causing various and foolish actions, in so much as many have called their Children Changelings, the alteration in their outward form as well as of the mind has been so great."

He enumerates twelve diseases; by touching people affected by them, bewitchment sickness will be produced by a mysteriously transferred power. Some of them are known as infectious diseases, like itch and leprosy; but think of the folly in the notion that a man suffering from common boils was able to "bewitch" another by the mere touch! In enumerating remedies, he names many substances which are to be worn about the sick, distinctly because "they are offensive to Devils," among them being mistletoe and ivy; but the majority of the prescriptions were substances to be worn amulet-wise about the neck. Among them were coral (*lapis amianthes*), grains of paris, and peony and rue, to defend from witchcraft, and especially to hang an amulet of loadstone, amber or red coal about the neck, as also carbuncles, sapphires and jacinths. Among minerals he commends gold (early form of gold cure), but especially native cinnabar and quicksilver to be hung against the pit of the stomach, having first been inclosed in a goose-quill, "or which is said to be more sympathetical into a hazle-nut-shell and sealed up therein with wax"; and he also recommends a ring made of an ass's hoof. Perhaps two hundred years from now, an electric finger-ring, worn as a remedy for rheumatism, will seem just as senseless and futile. In recommending prophylactic measures he quotes Porta as advising "to turn away the face of a Child that the witch may not fasten her Eyes on its Eyes, nor couple rays with the [child's] Eyes." Salmon himself—who was living when the burning of suspected witches in England was an every-day occurrence—says:

"You must remove the Child from the cause, to hinder the Impression, and avoid the company of the supposed witch."

Here it is only women who are supposed to have occult powers—*i. e.*, to be in league with the Devil; it was women only who were burned at Salem; and attention is here called to the fact that in the opprobrium which has been heaped on the forefathers for this act, it is lost sight of that in England, whence still emanated the ideas that dominated their lives, ten persons were burned as witches where one was in this country, no less than 3,000 persons being put to death for sorcery during the Long Parliament; and it was in America that a man—Judge Sewall—who had presided at the condemnation of the witch in 1692, had the penetration to discover his error, and in 1696 had the humility and magnanimity to cause his public recantation of his error to be read from the pulpit.

It is natural to ask why, when there was a witch, we find no corresponding wizard. The true reason runs far back in the centuries, and touches the history of all tribes and nations. The care of the sick and the knowledge of remedies in all the old barbaric nations was intrusted to the women; it was passed down from generation to generation in traditions, and the possessors of the knowledge accumulated in successive eras were looked upon as having mystical, if not supernatural powers; and, to quote Petersen:

"it was quite natural that with old, ugly women, to the eyes of young, suffering and impatient men this mysticalness should assume the aspect of wickedness."

The theologians explained it by Satan's seduction of

Eve. However we explain it, there is the fact that the *fin de siècle*, in the century that brought the forefathers across the ocean, was lighted up by the fires of witch burnings and religious persecutions, and blessed are those born after their lurid flames had died down. Another mystical element was mingled with the medicine of that time—astrology. Salmon, in giving directions for the hanging of disease-defying amulets about the necks of his bewitched patients, says:

"These you may hang about the neck when Luna is in conjunction with Mercury in his own House, and they both in time to Sol, and, if possible, to Jupiter, also; not forgetting to anoint the Pained with some of those Oils of Hypericon, aforesaid."

As inunctions of oil do abate those pinings caused by the true starvation that follows upon irritability of the alimentary apparatus, perhaps his patients improved. The toad figured largely in the *materia medica* of the time; and for the plague he commends

"the amulet of quicksilver, also a dried toad sewed up in a piece of silk and hung at the pit of the heart. Arsenic pure, not mixt with any other body lest its virtue be abated is profitable applied to the same place, wrapt up in silk; but it ought not to be heated lest it penetrate through the Pores into the Body."

Among the influences that may cause the plague he enumerates comets, eclipses, the major and minor conjunctions and oppositions of the planets and other

"ill Configurations of the Celestial bodies, and all these happening in the Sixth, Eighth, or Twelfth Houses of the Revolution of the world."

Puerile as these things seem, he talks like a man of sense when describing the course and symptoms of the Great Plague, saying:

"All which I can affirm from my own Experience who was an eye-witness thereof, during the whole last great Plague in London Anno 1665, in which died more than a hundred thousand. My constant visiting of the sick even some thousands of them through the whole course of the Plague has given me a more experimental knowledge of that disease than all that I have ever learned from any Author or Tutor whatsoever."

It seems that the times were taken advantage of by men who made anti-pestilential "salts" and "drinks"; and Salmon gives a list of hundreds of prescriptions, some containing twenty or more ingredients, and many preservatives, and some excellent sanitary directions; *e. g.*, not to handle garments or quilts used about those who have died, etc.; and in his "Lastly" he says:

"The pestilence is the Rod of God, and Man cannot fly from the presence of the Almighty or Beyond the reach of His Power, therefore as the greatest and chiefest thing; that every Man and Woman turn from their evil Ways, from all their Vices, Wickednesses, and Abominations and daily manifold offences, whether public or hidden by which God Almighty is provoked to wrath, and to manifest his displeasure in the destruction of mortals, yet retributing upon their heads but a small portion of their Crimes and Impieties, for as much as without such a speedy return and amendment, no trust or security can be put in any Caution, Preservative, or Antidote, what or how prudently soever composed."

Two hundred years later than when these works were written, Dr. Kitasato investigated this identical plague at Hongkong, discovered its specific microbe, which paid no attention to what house any of the planets were in, but promptly infested those whose blood was not strong enough to withstand it. Now news comes from Japan, that he has found a serum, bearing the same relation to it that antitoxin does to diphtheria.

Between the "simples" of the foremothers, consisting of an herb, often bitter or nauseous, steeped in water or vinegar, or "spirits," and the prescriptions of the learned physicians of England, often consisting of twenty ingredients, there is a wide difference. The first did no harm, but cleared the way at times for Nature's own restorative work; and hidden, among the multitudinous ingredients of the latter, we often find a trifle of mercury, or antimony or arsenic, and poppy juice, and occasionally opium. In the century 1700 to 1800 came a revolution in dosage for which the world is largely indebted to Germany; for there the medicinal metals were studied, caught and tamed, so to speak, and adapted to the healing of mankind.

It is difficult to trace the claims of mineral remedies as compared with the vegetable, and the list of the most efficient remedies that the modern physician depends mainly upon, is about equally divided between vegetables and minerals, tho the place formerly accorded to opium would, now that bichlorid of mercury is the most universally used antiseptic, be disputed by many. While the condensing and simplifying of medicines was going on in the last century, so that the "shot-gun" prescription—containing so many ingredients that some one must "hit" if all the other "missed," could be abolished, what may be called "healing by an attack from the outside" was discovered, in the practice of defeating the smallpox by inserting a prophylactic virus of the same disease in 1717, and the immeasurable improvement on that, of vaccination, introduced just a century since in 1796, and constituting a glorious medical *fin de siècle* for the preceding hundred years.

To this day the prejudice against mercurials, etc., survives in the appeal of the patent-medicine vender, of a "purely vegetable" remedy; but the man who has had most uncomfortable symptoms subdued by a few small white tablets, will not care to drink quarts of bitter vegetable concoctions, and as to animal remedies, they are repulsive to the last degree; vipers'-flesh, essence of vipers, crabs' eyes, crabs' claws and toads being recommended by Salmon, while Dr. Winthrop (Boston, 1643) dwells with complacency on "my black powder" against the plague, smallpox, etc., which was made by putting live toads into an earthen pot so as to half fill it, and then baking them or burning them in the open air "till they could be reduced by pounding to a powder." Let us all be glad that a phial with a few small tablets holds the potential curative ability of myriads of toads and vipers; and when we wish to pass into an ecstasy of gratitude let us reflect on anesthetics—the production of temporary insensibility at will—safely, quickly, pleasantly, which Dr. Holmes calls "one of those triumphs over the infirmities of our mortal condition which change the aspect of life ever afterwards."

Science.

THE disease in the peach which is known as the yellows has been so destructive in some parts of the East that Californians have invoked legal aid in destroying all trees shipped there that might possibly introduce the trouble to the Pacific Coast. But it has already made its appearance at Walla Walla, in the State of Washington, and legislation will scarcely stop its onward march. Science has not been able to clear up the mystery surrounding the origin of this destructive disease in the peach to general satisfaction. Some, however, are inclined to the belief that the trouble is caused by a virulent parasitic fungus of the mushroom family, known as *Agaricus melleus*. This fungus is fond of half-rotten wood, but is just as well satisfied, after once starting, with living as with dead roots. It often starts with the sprouting peach stone, and then continues with the young plant through life—indeed, in most cases the original peach stone is responsible for the trouble. Attacking the roots, a ferment condition of fungous growth is produced which finally permeates the whole tree. This takes a year or two to accomplish, and hence, tho the disease is really brewing in the tree from the first, it is not apparent in a one or two year old tree; not until the tree has reached three or four years old is the disease noticed in a seedling peach tree. When, however, the zymotic material has suffused a tree a bud or graft taken from it and inserted in another presents the original disease at once, just as a little yeast will at once start a whole lump of moistened flour. This is the only philosophic explanation of this singular disease that has been advanced. The Government has for several years employed an expert specially on the case, whose report simply states that it has been proved that the disease is contagious. This view is advanced to explain why the disease, tho existing in the North from the earliest introduction of peach culture, has not appeared in California and the Southern States, tho peach trees by the million have been sent from North to South. It is thought the climate is not suitable to the tastes of this rascally fungus. It is found abundantly in Michigan, and there the peach disease is very destructive. On the Pacific it is more than likely to make headway in moist climates like Oregon and Washington, tho it may not in California, should the diagnosis quoted prove to be correct.

...In a review in *Science* of an article by C. H. Merriam on the American bears, Dr. J. J. Allen, our leading mammalogist, agrees with the author that it will be necessary to recognize "a considerable number of new forms." Merriam admits eleven species, five of which are described as new. It has been customary to refer the bears of North America to three groups, consisting of the polar, grizzly and black bear type. To these Dr. Merriam adds the Sitka bear type and the Kadiak bear type. He separates the black bears into at least four species, and the grizzly into "four more or less marked forms." The largest of living species of bears is *Ursus middendorffii*, differing markedly from the other American species.

...In his report to the Academy of Natural Sciences of Philadelphia, on his explorations of certain caves in Tennessee, Mr. Mercer mentions finding in Tirkel's caves teeth and bones of the peccary, tapir, and in another cave remains of the giant sloth, *Myiodon*, and in Big Bone Cave the bones of a still larger sloth, *Megalonyx*, still bearing articular cartilages, which indicates for this animal an age certainly not more remote than the existence of man on this continent.

...How long it takes the Californian trapdoor spider to construct its nest when in confinement, and other points in its habits has been reported by Dr. Davidson. The spider was ten hours in making its nest with the hinged trap, another spider requiring two hours to make a hole deep enough to conceal itself. The young